

CLAIMS

What is claimed is:

1. A flashlight comprising

a battery housing comprising a front end and a rear end, wherein said housing has a flattened cross-section defining a front side and a back side and is configured to accept a plurality of batteries in a side-by-side configuration comprising adjacent first and second rows of batteries;

a pivot contact at the interior of said rear end providing an electrical connection between a battery in said first row to a battery in said second row, wherein said contact comprises a support with a pivot and a conductive material configured to provide an electrical path between said adjacent rows of batteries;

a rotatable head comprising a circular housing connection and a light source assembly, wherein said housing connection is attached to said housing at said front end, wherein said light source assembly is oriented at 90 ± 30 degrees to the long axis of said battery housing, said rotatable head is rotatable about said long axis, and said rotatable head is free of protrusions; and

electrical connections for providing electrical power from said batteries to a light source in said light source assembly.

2. The flashlight of claim 1, further comprising a glass breaker comprising a flattened hard material triangle or rectangle mounted at said rear end or at said head, with a vertex of said triangle protruding transversely from said housing or said head and the side of said triangle opposite said vertex bearing against said housing or said head.

3. The flashlight of claim 1, wherein said rotatable head is changeable with a bezel and light source assembly.

4. The flashlight of claim 1, further comprising a clip attached at said rear end, wherein said clip comprises a seat belt cutter.

5. The flashlight of claim 2, wherein said glass breaker is at an angle of 70-85 degrees to the long axis of said battery housing.
6. The flashlight of claim 1, wherein said pivot contact comprises an off-center pivot.
7. The flashlight of claim 1, wherein said pivot contact further comprises a coil spring aligned with said second row of batteries, oriented toward said opening.
8. The flashlight of claim 7, further comprising polarizing contacts at said spring.
9. The flashlight of claim 1, further comprising a battery polarizer, such that only if said batteries are inserted with correct orientation will an electrical circuit be established to energize the light source.
10. The flashlight of claim 1, further comprising a gas vent allowing venting of gases from said housing.
11. The flashlight of claim 1, wherein said flashlight is adapted for use in hazardous environments.
12. The flashlight of claim 1, wherein said flashlight is waterproof.
13. The flashlight of claim 1, wherein said flashlight passes the UL 30 foot drop test.
14. The flashlight of claim 1, wherein said head is threaded to said housing.
15. The flashlight of claim 1, wherein said housing is configured to accept 4 cylindrical batteries with two batteries in each of said rows.
16. The flashlight of claim 1, wherein said pivot contact comprises a curved pivot surface on the back of said contact.

17. The flashlight of claim 1, wherein an arm of said pivot contact presses against the inside of the rear end of said housing when said flashlight is closed with batteries in place.

18. The flashlight of claim 2, wherein said triangle is a carbide machine tool insert.

19. The flashlight of claim 18, wherein said triangle provides 6 impact points.

20. The flashlight of claim 1, wherein said housing comprises a flattened transverse bearing surface on said back side, such that said bearing surface stabilizes said flashlight when said flashlight is laid on its back on a level surface.

21. The flashlight of claim 1, wherein said seat belt cutter comprises a multi-edge blade.

22. A flashlight comprising
a battery housing comprising a front end and a rear end;
a rotatable head comprising a circular housing connection, wherein said housing connection is attached to said housing at said front end and is replaceably removable at said housing connection to allow insertion of batteries, said rotatable head bears a light source assembly oriented at 90 ± 30 degrees to the long axis of said battery housing, and said rotatable head is rotatable about said long axis;
electrical connections for providing electrical power from said batteries to a light source in said light source assembly.

23. The flashlight of claim 22, wherein removal of said rotatable head at said housing connection allows insertion of batteries in said battery housing.

24. The flashlight of claim 22, wherein said rotatable head is free of protrusions.

25. The flashlight of claim 22, wherein said housing is generally cylindrical along the long axis.

26. The flashlight of claim 22, wherein said housing has a flattened cross-section defining a front side and a back side and is configured to accept a plurality of batteries in a side-by-side configuration comprising adjacent first and second rows of batteries

27. The flashlight of claim 26, further comprising a pivot contact at said rear end providing an electrical connection between a battery in said first row to a battery in said second row, wherein said contact comprises a support with an off-center pivot and a conductive material configured to provide an electrical path between said adjacent rows of batteries.

28. The flashlight of claim 26, wherein said housing comprises an opening at said front end aligned with said second row, for insertion of said batteries, and wherein said pivot contact has a short side oriented for contact with said second row.

29. The flashlight of claim 27, wherein said pivot contact further comprises a coil spring on said short side, oriented toward said opening.

30. The flashlight of claim 29, further comprising polarizing contacts at said spring.

31. The flashlight of claim 22, further comprising a battery polarizer, such that only if said batteries are inserted with correct orientation will an electrical circuit be established to energize the light source.

32. The flashlight of claim 22, further comprising a gas vent allowing venting of gases from said housing.

33. The flashlight of claim 22, wherein said flashlight is adapted for use in hazardous environments.

34. The flashlight of claim 22, wherein said flashlight is waterproof.
35. The flashlight of claim 22, wherein said flashlight passes the UL 30 foot drop test.
36. The flashlight of claim 22, wherein said head is threaded to said housing at said housing connection.
37. The flashlight of claim 36, wherein threading said head on said housing with batteries in said housing establishes electrical contact at said pivot contact.
38. The flashlight of claim 22, wherein said housing is configured to accept 4 cylindrical batteries with two batteries in each of said rows.
39. The flashlight of claim 38, wherein said batteries are C batteries.
40. The flashlight of claim 26, wherein said pivot contact comprises a curved pivot surface on the back of said contact.
41. The flashlight of claim 22, wherein an arm of said pivot contact presses against the inside of the rear end of said housing when said flashlight is closed with batteries in place.
42. The flashlight of claim 22, further comprising a glass breaker attached at the rear end of said housing.
43. The flashlight of claim 42, wherein said glass breaker comprises a flat hard material polygon configured such that a side or sides of said polygon bears against said housing and the vertex opposite said side or sides extends transversely from said housing sufficiently to enable the vertex to contact a glass surface.

44. The flashlight of claim 43, wherein said flat polygon is oriented at an angle of 45-90 degrees to the long axis of said housing.

45. The flashlight of claim 44, wherein said angle is 55-85 degrees.

46. The flashlight of claim 44, wherein said angle is 65-80 degrees.

47. The flashlight of claim 43, wherein said polygon is a carbide machine tool insert.

48. The flashlight of claim 43, wherein said polygon is a triangle and provides 6 impact points.

49. The flashlight of claim 42, wherein said glass breaker comprises an impact point and a surface or surfaces distal from said point bearing against said housing for coupling kinetic energy between said housing and said impact point, wherein the area of said surface is at least 10 mm².

50. The flashlight of claim 22, wherein said housing comprises a flattened transverse bearing surface on said back side at said rear end, such that said bearing surface stabilizes said flashlight when said flashlight is laid on its back on a level surface.

51. The flashlight of claim 22, further comprising a clip attached on said front side at said rear end, wherein said clip comprises a seat belt cutter.

52. The flashlight of claim 51, wherein said cutter comprises a multi-edge blade.

53. A flashlight comprising
a battery housing comprising a front end and a rear end and having a long axis through said front end and rear end;

an illumination head attached at said front end, comprising a bezel and a light source assembly that can be electrically connected to said batteries;

electrical connections for providing electrical power from said batteries to a light source in said light source assembly; and

a glass breaker attached to said housing or said illumination head comprising a hard material insert having at least one vertex, wherein a vertex of said insert protrudes transversely from said flashlight.

54. The flashlight of claim 53, wherein said housing is generally cylindrical.

55. The flashlight of claim 53, wherein said housing has a flattened cross-section and is configured to accept a plurality of batteries in a side-by-side configuration comprising adjacent first and second rows of batteries parallel to the long axis of said housing.

56. The flashlight of claim 53, wherein said illumination head is a rotatable head free of protrusions attached at said front end, wherein said rotatable head bears a light source assembly oriented at 90 ± 30 degrees to the long axis of said battery housing, and said rotatable head is rotatable about said long axis.

57. The flashlight of claim 53, wherein said glass breaker comprises a machine tool carbide insert.

58. The flashlight of claim 53, wherein said glass breaker comprises a triangular plate attached on the rear end of said flashlight and is oriented such that the plane of the triangle forms an angle with the said longitudinal axis of between 70 and 85 degrees.

59. The flashlight of claim 53, wherein said glass breaker comprises a triangular plate attached to said illumination head and is oriented such that the plane of the triangle forms an angle with the said longitudinal axis of between 70 and 85 degrees.

60. A flashlight comprising

a battery housing comprising a front end and a rear end, wherein said housing has a flattened cross-section defining a front side and a back side and is configured to accept a

plurality of batteries in a side-by-side configuration comprising adjacent first and second rows of batteries;

a rotatable head comprising a circular housing connection and a light source assembly, wherein said housing connection is attached to said housing at said front end, wherein said light source assembly is oriented at 90 ± 30 degrees to the long axis of said battery housing, said rotatable head is rotatable about said long axis at said circular housing connection, and said rotatable head is free of protrusions; and

electrical connections for providing electrical power from said batteries to a light source in said light source assembly.

61. The flashlight of claim 60, wherein said battery housing is openable at said rear end for insertion of said batteries.

62. The flashlight of claim 60, wherein said rotatable head is removable to allow insertion of said batteries.

63. The flashlight of claim 60, further comprising a pivot contact at the interior of said rear end providing an electrical connection between a battery in said first row to a battery in said second row, wherein said contact comprises a support with a pivot and a conductive material configured to provide an electrical path between said adjacent rows of batteries.

64. The flashlight of claim 60, further comprising a glass breaker mounted at said rear end or said head and protruding transversely.

65. The flashlight of claim 60, further comprising a glass breaker comprising a flattened triangle formed of a hard material mounted at said rear end or on said head with a vertex of said triangle protruding transversely from said housing or said head and the side of said triangle opposite said vertex bearing against said housing or said head.

66. The flashlight of claim 60, further comprising a clip attached at said rear end, wherein said clip comprises a seat belt cutter.

67. A rotatable angled flashlight head, comprising
a body having a first end adapted for replaceable attachment to a flashlight battery housing, and a second end adapted for holding a light source assembly, wherein a central axis passing through said first end makes an angle of 90 ± 30 degrees with a central axis passing through said second end; and
electrical connections within said device configured to electrically connect batteries in said battery housing with a light source in said light source assembly,
wherein said angled flashlight head is rotatable about the central axis through said first end when installed on a battery housing.

68. The angled head of claim 67, wherein said angled head comprises a threaded portion at said first end adapted to screw onto a threaded portion of said battery housing.

69. The angled head of claim 67, wherein further comprising said light source assembly.

70. The angled head of claim 67, wherein said second end comprises a threaded portion adapted for attachment of a threaded bezel.

71. The angled head of claim 70, wherein said threaded portion of said angled head is configured to accept a threaded bezel that will also screw onto a threaded portion of said battery housing, thereby retaining a light source assembly in a position that is electrically connectable with batteries in said battery housing.

72. The angled head of claim 67, further comprising a glass breaker.

73. A flashlight kit comprising
a flashlight battery housing comprising ;
a rotatable angled head, wherein a first end of said angled head attaches to said battery housing and a second end of said angled head attaches to a bezel; and

a straight head, or a bezel with a light source assembly, wherein said bezel is adapted to optionally attach to either said battery housing or said second end of said angled head, wherein attachment of said straight head or said bezel to said battery housing provides a flashlight with a straight head, and attachment of said bezel to said angled head and attachment of said angled head to said battery housing provides a flashlight with a rotatable angled head.